Final Report

A project under the Canada
New Brunswick Conservation
and Renewable Energy
Demonstration Program

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UTILITY INTERCONNECTION

N.B. ENERGY SECRETARIAT

February, 1985

CREDA Project #2041

Canada/New Brunswick Conservation and Renewable Energy Demonstration Program

The Conservation and Renewable Energy Demonstration Program Program is administered in New Brunswick by the Energy Secretariat and managed jointly with Energy, Mines and Resources Canada. The Program is designed to help demonstrate promising conservation and renewable energy technologies, to develop public awareness and understanding of these technologies, and to create employment in new or existing industries.

Through over 100 demonstration projects in New Brunswick, a wide variety of conservation and renewable energy technologies have proven to be technically sound and economically attractive. These demonstration projects should now provide a catalyst for commercialization and lead to widespread adoption of many of these proven technologies.

This final report is based on a project which was financially supported by the Energy Demonstration Program. For further information on other demonstration projects funded in New Brunswick under this program, contact:

Conservation & Renewable
Energy Division
Energy Secretariat
P.O. Box 6000
Fredericton, N.B.
E3B 5H1
(506) 453-3897

Programme Canada/Nouveau-Brunswick de démonstration des économies d'énergie et des énergies renouvelables

Le Programme de démonstration des économies d'énergie et des énergies renouvelables est administré au Nouveau-Brunswick par le Secrétariat à l'énergie, en collaboration avec Energie, Mines et Ressources Canada. Ce programme tente d'abord de vérifier la fiabilité des techniques de conservation d'énergie, d'accroître la sensibilité du public envers ces techniques et, enfin, de favoriser la création d'emplois au sein des industries nouvelles ou déjà existantes.

Un grand nombre de projets de démonstration se sont avérés à la fois techniquement réalisables et économiquement attrayants.

Le succès ainsi rencontré encourage la commercialisation des procédés les plus accessibles. Cela entraînerait certes l'adoption d'un grand nombre de ces techniques par les propriétaires de domiciles et par l'industrie privée.

Ce rapport final est basé sur un projet qui a reçu une aide financière du Programme de démonstration. Pour de plus amples renseignements, communiquez avec la:

Division des économies d'énergie
et des énergies renouvelables
Secrétariat à l'énergie
C.P. 6000
Fredericton, N.-B.
E3B 5H1
(506) 453-3897

D I S C L A I M E R

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D E N I D E R E S P O N S A B I L I T E

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1.0 EXECUTIVE SUMMARY

The project described here consisted of an independent study into the problems of interconnecting small power producers (chiefly wind turbines) to a large grid system.

The project was successful in having the two large commercial power companies in the province (N.B. Power, Power Commission of the City of Saint John) draft policy regarding interconnection. These policy documents set out acceptable terms of reference for the small power producer consistent with the long term integrity of the provincial grid, safety, and buy back rate.

I.0 SOMMAIRE EXECUTIF

Le projet décrit dans ce rapport consiste en une étude indépendante sur les problèmes rencontrés lors du branchement des fournisseurs qui exploitent un générateur de petite capacité (principalement les turbines éoliennes) au grand réseau.

La participation des deux compagnies d'électricité commerciale de la province (Energie Nouveau-Brunswick et la compagnie d'électricité de la cité de Saint Jean) dans la préparation des politiques sur le branchement a fait une réussite de ce projet. Les documents présentent des termes de référence acceptables par les fournisseurs qui exploitent un générateur de petite capacité qui sont logiques avec l'intégrité à long terme du réseau provincial, de la sécurité et du taux de reprise.

2.0 INTRODUCTION AND BACKGROUND

Early in the CREDA program, it became apparent that sizable numbers of individuals would propose energy projects which might want or need interconnection to the provincial electricity grid. Because no firm policy existed, a consultant was retained to coordinate the creation of such a policy with the wind turbine proponents, the Power Commission and the Provincial Electrical Inspector.

3.0 DESCRIPTION

The project resulted in the two policy statements by the two Power Commissions and the interconnection of two wind turbine generators. The wind generators' reports are included in the Small Scale Program as administered by the Research and Productivity Council (RPC) in Fredericton.

The policy statements are presented in their entirety in Appendix I and II.

4.0 COST

Funding for the project was provided by the N.B. Energy Secretariat through the Conservation and Renewable Energy Demonstration Program at a total cost of $ 8,227.30

5.0 CONCLUSIONS

The project was successful in establishing firm policy on the interconnection of small power producers to a large grid. Additionally, the Electrical Inspector of the Department of Labour imposes no additonal regulation at this time. Only normal electrical practice must be observed.

APPENDIX I

Exerpt from N.B. Power Customer Service Policy

ENERGY SECRETARIAT
NEW BRUNSWICK

FORM 631 1982-11

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THE NEW BRUNSWICK ELECTRIC POWER COMMISSION

ADMINISTRATIVE DIRECTIVE MANUAL FILE.....

SUBJECT TITLE: CUSTOMER SERVICE Wind Turbine Generator Policy	No.: ID-14
	Page 1 of 2
	Date Effective 1983-02-25
Prepared by: Administration / Approved by R. A. Jones	Superseding Date New

INTRODUCTION: The Federal Government in cooperation with the Provincial Government is encouraging the use of Wind Turbine Generators as an alternative energy source. N. B. Power will, therefore, permit interconnection of customer owned Wind Turbine Generators. This policy reflects current practices of other utilities across North America.

POLICY:

1. N. B. Power will permit interconnections of Wind Turbine Generators when there are no potential adverse effects to the general public or to N. B. Power equipment or personnel.

2. The customer must design and operate the facilities in a manner satisfactory to N. B. Power. N. B. Power will not assume any responsibility associated with Customer equipment.

3. The customer will receive payment for energy fed back into N. B. Power's system at the same rate as that established for customers who generate energy for their own on-site use and who deliver excess (surplus) energy to N. B. Power.

4. The customer will pay all costs associated with the interconnection.

5. The customer shall indemnify and hold N. B. Power free of any liability for damages to N. B. Power or others arising out of misoperation of the customer's facilities.

6. The Commercial Operations Division will be responsible for the administration of this policy.

POLICY: WIND TURBINE GENERATOR

N.B. Power will permit the interconnection of Wind Turbine Generators (W.T.G.) whenever this can be done without adverse effects on the general public or to N.B. Power equipment or personnel. Protective disconnect devices and metering equipment (power to and from) as approved by N.B. Power must be installed at any location where a customer desires to operate in parallel with N.B. Power's system.

N.B. Power will not assume any responsibility for the electrical protection of the customer's generator or any other portion of the customer's equipment.

The customer will receive payment for energy fed back into N.B. Power's system at the same rate as that established for customers who deliver surplus energy to N.B. Power. This rate is presently calculated at 70% of N.B. Power's monthly average avoided cost.

All cost associated with the interconnection will be paid for by the customer. This includes all modifications to N.B. Power's system needed to ensure equipment protection and safe operation.

The customer shall indemnify and hold N.B. Power free of any liability for damages to N.B. Power or others arising out of the misoperation or malfunction of the customer-owned facilities. This also includes release of liablility related to customer's equipment, unless caused solely by N.B. Power's negligence.

General design requirements are as follows:

- customer obtains all permits including electrical wiring permits;
- customer installation meets all construction and safety rules;
- customer equipment meets approval of Canadian Standards Association (CSA) or must be listed by CSA as being in compliance with standards.
- manual disconnecting device capable of being locked in the open position must be located on the outside of the customer's building for visible isolation of the generator from N.B. Power's system and for easy access by N.B. Power personnel.
- when short circuits cause N.B. Power's system to "trip off", the customer must provide for disconnection of their generator. Disconnection must occur prior to automatic reclosing.

Customer operations must be as follows:

- the interconnection shall not cause any reduction in quality of service provided to other customers. No abnormal voltages, frequencies, interruptions or harmonic interferences will be permitted.
- the customer will not be permitted to energize or de-energize any N.B. Power circuits.
- the customer's generators shall not adversely affect the voltage regulations of N.B. Power's system. The customer's equipment must be

capable of withstanding normal voltage changes in N.B. Power's system.

- the customer shall discontinue parallel operation when requested by N.B. Power for the following reasons:
  - facilitate maintenance, test or repair of utility facilities,
  - during system emergencies,
  - when customer's equipment is interfering with other customer's on the system
  - when inspection reveals customer's equipment hazardous to N.B. Power's system,
  - when inspection reveals lack of necessary maintenance of customer's equipment to protect N.B. Power's system.

When special situations arise which are not covered by the above policy points or by N.B. Power standards, they will be resolved through negotiations between the customer and head office staff of Commercial Operations Division.

APPENDIX II

Exerpt from the Power Commission of the City of Saint John

Customer Service Policy

August 13, 1982

POLICY: WIND TURBINE GENERATION

Interconnection of Wind Turbine Generators with The Power Commission of the City of Saint John facilities shall be permitted only with compliance to the following requirements:

(a) The customer shall purchase, own and be responsible for all equipment, except revenue meters, beyond the point of connection with the P.C.C.S.J. system (normally the service entrance head).

(b) The customer shall release and save harmless P.C.C.S.J. from any liability for injury or damages to the customer's facilities arising out of parallel operation unless caused solely by P.C.C.S.J. negligence. In addition the customer shall be liable for any injury or damages to P.C.C.S.J. personnel, property or the public where such was caused in whole or in part by the use, ownership or operation of the customer's facilities.

(c) The customer must assure that there will be no reduction in the quality of service to other P.C.C.S.J. customers due to the operation of the customer's facilities. Any complaints of high or low voltage, flicker or harmonics shall be just cause for disconnection of the customer's facilities until the problems are resolved.

(d) The customer must submit detailed drawings of the proposed interconnection and control circuitry along with a variance granted by the Electrical Inspector for each installation. P.C.C.S.J. will grant approval on an individual basis only.

(e) The customer's generator must automatically shut down and/or disconnect itself from the line on any loss of supply. The customer must under no circumstance, attempt to operate the generator connected to the P.C.C.S.J. system, while the supply line is de-energized.

(f) The customer must discontinue parallel operation when requested by P.C.C.S.J.:

(1) To facilitate maintenance, test or repair of utility facilities.

(2) During system emergencies.

(3) When the customer's generating equipment is interfering with other customer's on the system.

(4) When an inspection of the customer's generating equipment reveals a condition hazardous to the P.C.C.S.J. system, and the customer shall not resume parallel operation until given permission by P.C.C.S.J. to do so.

(g) P.C.C.S.J. maintains the right to inspect the customer's generating equipment and protection devices at any time.

(h) A means of visible disconnection of the customer's generator which is accessible and operable by P.C.C.S.J. personnel must be provided.

Any costs associated with work done by P.C.C.S.J. to permit the interconnection of the customer's generator will be borne by the customer.

The customer shall receive credit for energy (KWH's) only supplied to P.C.C.S.J. as measured by the meter used for this purpose. A service charge shall be applied against this credit.

The rate at which customer supplied KWH's shall be credited will be the "run off rate" for the Commission's Industrial Service Class II rate classification.